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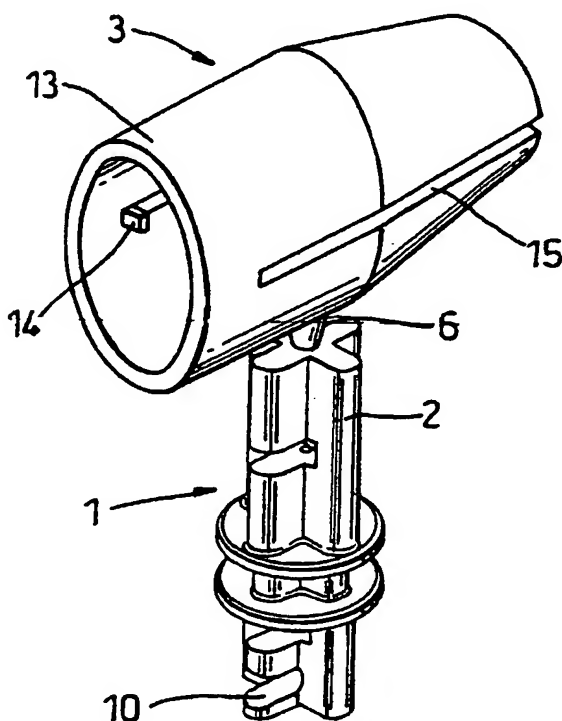
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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: INTEGRATION OF A LANCETTE WITH ITS CAPTURING AND REMOVING CAP



(57) Abstract: A lancet body (2) is integrally moulded with a cap (3) for a firing device, the cap concealing the needle tip (5). The cap (3) can be used to insert the lancet (1), which is held while the cap is twisted off. The cap (3) is then fitted to the firing device to provide an apertured platform to be held against the skin and through which the needle tip (5) will momentarily project. The cap (3) has to be deformed to fit, and on being removed and recovering its natural shape internal lugs (14) catch hold of the released lancet (1) and remove that as well.

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## INTEGRATION OF A LANCETTE WITH ITS CAPTURING AND REMOVING CAP

This invention relates to combined lancets and caps.

Such a combination is described in US 5,324,303. A lancet body is integrally moulded with a cap, initially to  
5 conceal the tip of a needle largely embedded in the lancet body. This renders the tip safe while the lancet is handled before use. The cap can be twisted off to reveal the needle tip and then fitted to the forward end of a firing device, with the lancet inserted. It provides a platform  
10 which is pressed against the user's skin and an aperture through which the needle tip is momentarily projected when the device is fired.

After use, the lancet should be disposed of safely since the needle will be contaminated. This can easily  
15 spread to the cap as well, and so that should be disposed of at the same time. The firing device is not at risk, and can be re-used indefinitely.

It is the aim of this invention to provide an arrangement where the removal of the cap also removes the lancet  
20 with its needle tip safely housed inside the cap, so that both can be thrown away together without exposure of the needle tip.

According to the present invention there is provided a combined lancet and cap for a lancet firing device to which  
25 the cap can be fitted to provide an apertured platform to bear against the user's skin and through which the tip of the lancet needle is momentarily projected when the device

is fired, the cap and lancet body being integrally moulded in plastics material with the cap concealing the needle tip but being breakable away from the body to expose that tip, wherein the cap is moulded with a shape that requires manual deformation to fit the firing device and wherein, when removed after use, the cap reverts to its natural shape and thereby captures and removes the lancet with the needle tip safe within the cap.

In one preferred form the rear end of the cap is non-circular. Compression along its major axis will cause it to become circular to fit a firing device, cylindrical at its forward end at least. There are various possible modes of engagement, for example by screw thread, by a bayonet type fitting, or by snap-fitting.

Also in the preferred form, the interior of the cap has opposed projections on its minor axis and the lancet body has an abutment behind which the projections can engage when the cap is removed from a firing device and reverts to its natural shape but which is clear of the projections when the cap is deformed and fitted to a firing device. Assuming the rear end of the cap is elliptical, reducing the major axis increases the minor axis of the cross-section, thereby moving the projections outwardly where they do not interfere with the forward and reverse motion of the lancet.

It is also advisable for the lancet to have a further abutment to the rear of the first one, the projections engaging between the abutments when the cap is removed from a firing device. This will prevent the lancet moving

forward sufficiently for the needle tip to be re-exposed through the front of the cap.

The lancet body should be non-rotative in the firing device. It can be inserted using the cap as a handle, the rear end of the lancet being receivable by a holder within the device. The cap is then twisted to break away from the lancet body. The lancet body and holder will conveniently be adapted to be retained in a retracted position within the firing device when the lancet is inserted. It will therefore be prevented from falling out accidentally before the cap is fitted, and it will be properly located for firing.

For a better understanding of the invention, one embodiment will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a combined lancet and cap,

Figure 2 is a side view of the lancet and cap,

Figure 3 is another side view of the lancet and cap in the direction A of Figure 2,

Figure 4 is a section on the line IV-IV of Figure 2,

Figure 5 is a section on the line V-V of Figure 2,

Figure 6 is a section on the line VI-VI of Figure 2, and,

Figure 7 is a section on the line VII-VII of Figure 2.

A lancet 1 has a plastics body 2 integrally moulded with a cap 3. The body 2 contains a needle 4 whose tip 5 projects into a neck 6 which connects the body 2 and the cap

3. The lancet is designed to be fired by a device (not shown) into whose forward end the cap 3 can fit.

The lancet 1 is mostly of cruciform shape throughout its length, but shortly beyond its mid-point from the cap 3 there are two axially spaced circular ribs 7 and 8 of a radius that makes them slightly proud of the cylindrical envelope of the rest of the body 2. There are various diametral and radial passages 9 and 10 left by the moulding process, are necessary for holding the needle 4.

10 The cap 3 is of cup-like form with a circular base 11 having a central aperture 12. From the rim of the base 11 it flares outwardly, developing into an elliptical cross-section, and at about the mid-length there is a break into a portion 13 of constant elliptical cross-section. The neck 6 is situated at this break. Internally of this portion 13 there are two opposed lugs 14 on the minor axis of the elliptical cross-section. These are at the ends of longitudinal slots 15 extending from the base 11 which are necessary for simplifying the mould.

20 For use, the lancet 1 and cap is inserted rear end first into the cylindrical forward end of a firing device using the cap 3 as a handle. The lancet is captured within the device by means of interference between its rear end and a spring-loaded, cup-like lancet holder. It is held against rotation by the action of internal ribs within the lancet holder engaging with the cruciform shape of the lancet body. The lancet holder itself is held against rotation but can of course move longitudinally of the firing device when

released. The action of pushing the lancet in may retract the holder to a cocked position, where it is held by a trigger device. The cap 3 is then twisted, and this breaks it away from the lancet body 2 at the narrowest point of the neck 6, leaving the tip of the needle 5 exposed. The large open end portion 13 of the cap 3 is then presented to the forward end of the firing device, the portion 13 being squeezed along the major axis of the elliptical cross-section. The nature of the plastics material and its thickness allow it to be deformed into a circular cross-section. It can then enter the forward end of the firing device and, for example, screw into it. But as mentioned above, there are other forms of engagement.

The device is used by placing the base 11, serving as a platform, against the skin, and firing the lancet so that the needle tip momentarily projects through the aperture 12. The lancet bounces back so that the tip is safely within the cap. The lugs 14 are then opposite or possibly slightly to the rear of the gap between the ribs 7 and 8. The cap is removed and, if it is an unscrewing action, the length of the thread is such that the lugs 14 will remain in or come into registry with the gap between the ribs 7 and 8 as the cap comes clear. Alternatively, if the lancet cap 3 is clipped into the front of the firing device then it may be removed by sliding an ejector of the device forwards, which then acts on the edge of the open end portion 13 of the cap, pushing it away from the device. As the cap is freed from whatever engagement it had with the firing device the

portion 13 immediately reverts to its elliptical cross-section and the lugs 14 close towards each other and engage between the ribs 7 and 8. The lancet 1 is therefore captured by the cap 3 with the needle tip safely inside.

5 The cap is lightly pulled by the rib 7 to unplug the lancet 1 from the spring-loaded holder and it can then be thrown away with the lancet attached as a single item. The rib 8 stops the lancet moving forwards within the cap sufficiently to re-expose the needle tip 5 through the aperture 12.

10 With the lancet shown, the cap is intended to fit within the forward end of the firing device. But with some re-design, bringing the ribs 7 and 8 forwards, and making the lugs 14 more prominent as well as having them not so far back, a cap could be made to fit (with the necessary  
15 preliminary distortion) outside the firing device.

Claims

1. A combined lancet and cap for a lancet firing device to which the cap can be fitted to provide an apertured platform to bear against the user's skin and through which the tip of the lancet needle is momentarily projected when the device is fired, the cap and lancet body being integrally moulded in plastics material with the cap concealing the needle tip but being breakable away from the body to expose that tip, wherein the cap is moulded with a shape that requires manual deformation to fit the firing device and wherein, when removed after use, the cap reverts to its natural shape and thereby captures and removes the lancet with the needle tip safe within the cap.
2. A combined lancet and cap as claimed in Claim 1, wherein the rear end of the cap is non-circular, deformable into circular to fit a firing device.
3. A combined lancet and cap as claimed in Claim 2, wherein the cap is adapted to engage a firing device by a screw thread.
4. A combined lancet and cap as claimed in Claim 2, wherein the cap is adapted to engage a firing device by a bayonet type fitting.
5. A combined lancet and cap as claimed in Claim 2, wherein the cap is adapted to engage a firing device by a snap fitting.
6. A combined lancet and cap as claimed in any one of Claims 2 to 5, wherein the interior of the cap has opposed projections on its minor axis and the lancet body has an

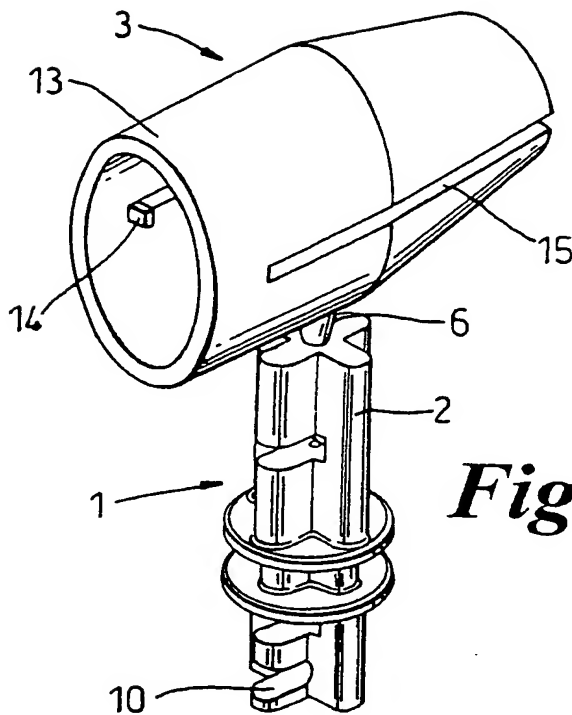


abutment behind which the projections engage when the cap is removed from a firing device and reverts to its natural shape, but which is clear of the projections when the cap is deformed and fitted to a firing device.

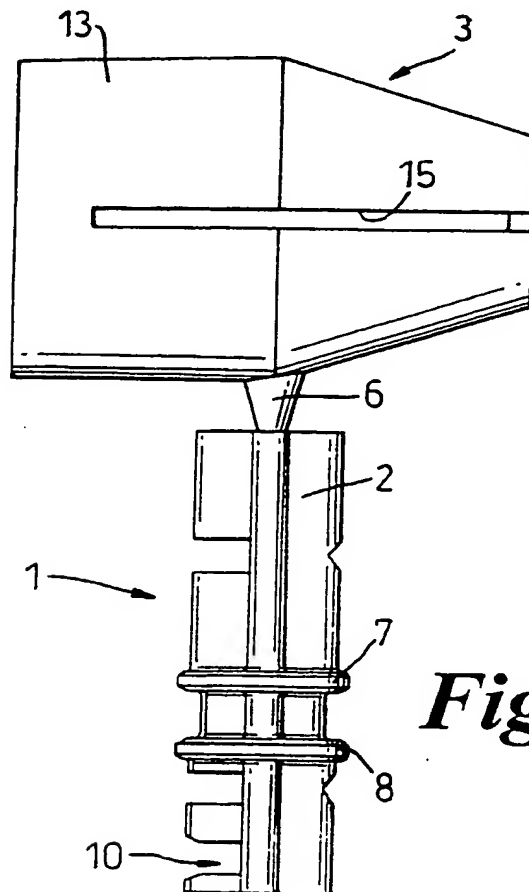
5 7. A combined lancet and cap as claimed in Claim 6, wherein the lancet has a further abutment to the rear of the first one, the projections engaging between the abutments when the cap is removed from a firing device.

10 8. A combined lancet and cap as claimed in any preceding claim, in combination with a firing device, wherein the rear end of the lancet body is non-rotatively receivable by a holder in the firing device.

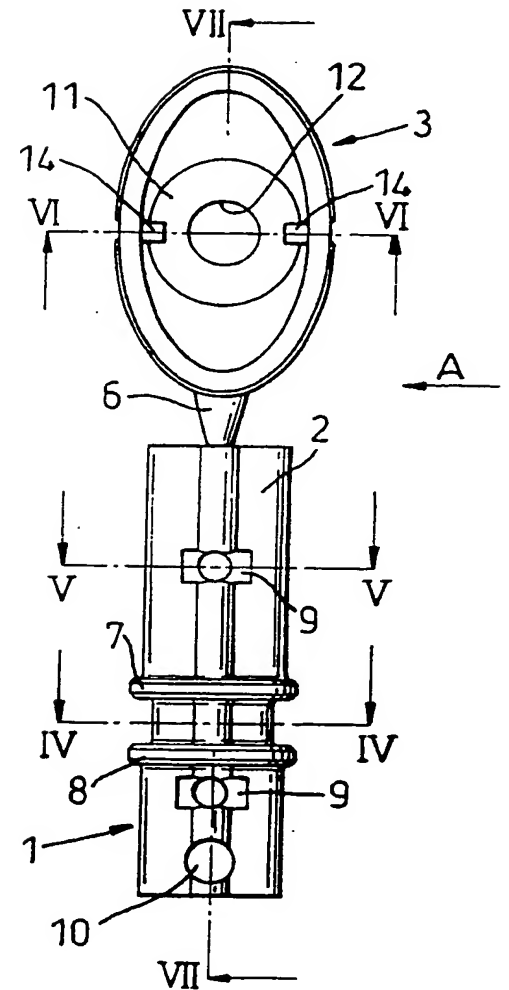
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**Fig. 1**

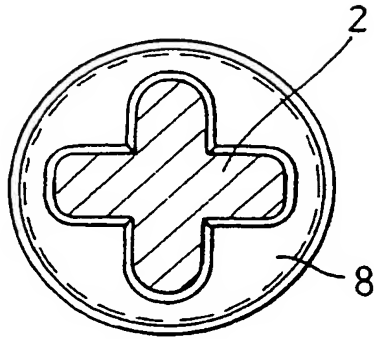


**Fig. 3**

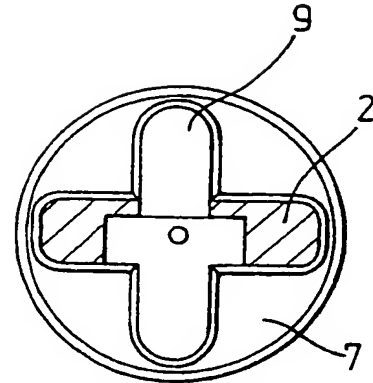


**Fig. 2**

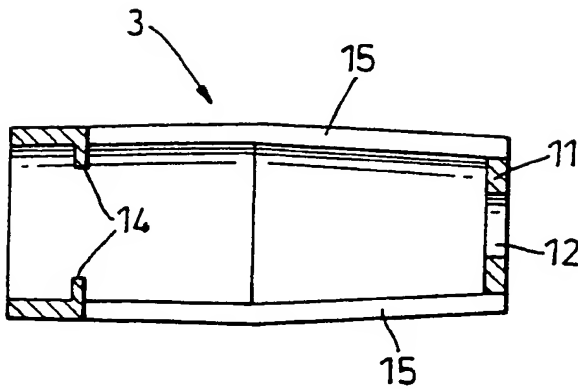
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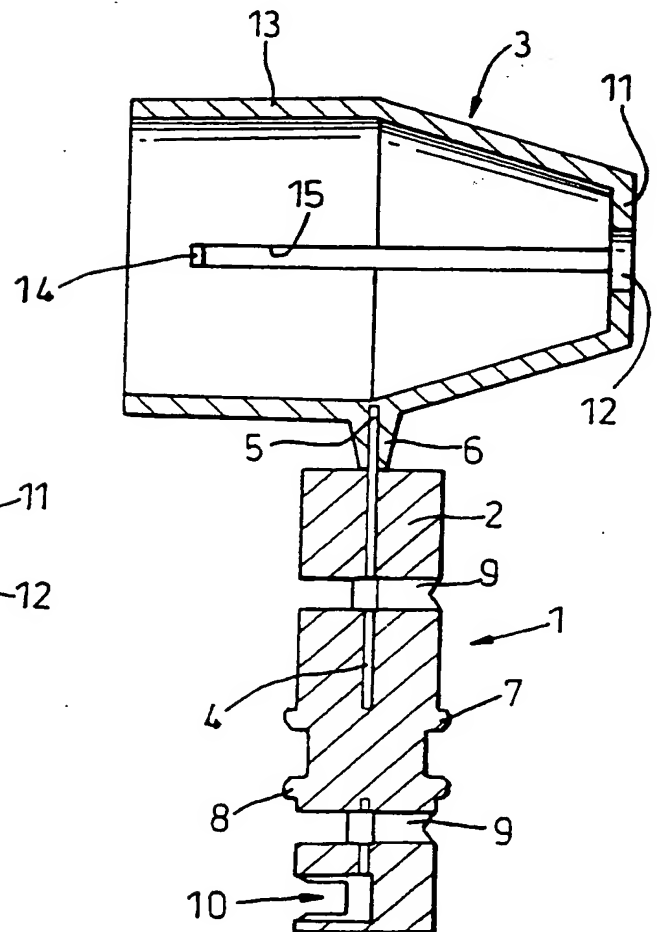
**Fig. 4**



**Fig. 5**



**Fig. 6**



**Fig. 7**

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/04672

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61B5/15

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 324 303 A (ORINGER ROBERT ET AL) 28 June 1994 (1994-06-28) cited in the application column 2, line 1 - line 31 column 5, line 40-46 ---	1,5-8
A	EP 0 885 590 A (BAYER AG) 23 December 1998 (1998-12-23) abstract; figures 1,2 ---	3
A	US 5 304 193 A (ZHADANOV SAM) 19 April 1994 (1994-04-19) abstract; figure 1 column 1, line 65 -column 2, line 11 --- -/-	4

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the International search

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# INTERNATIONAL SEARCH REPORT

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PCT/GB 00/04672

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 454 828 A (SCHRAGA STEVEN) 3 October 1995 (1995-10-03) abstract column 2, line 26 -column 3, line 15; figures 1-4	1
A	DE 197 18 081 A (BOEHRINGER MANNHEIM GMBH) 5 November 1998 (1998-11-05) abstract column 2, line 11 - line 39; figures 1,.3	1

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/04672

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5324303	A	28-06-1994	CA 2079192 A US 5423847 A	26-03-1994 13-06-1995
EP 0885590	A	23-12-1998	US 5916230 A AU 709062 B AU 7187298 A CA 2236133 A JP 11009577 A	29-06-1999 19-08-1999 17-12-1998 16-12-1998 19-01-1999
US 5304193	A	19-04-1994	NONE	
US 5454828	A	03-10-1995	AU 2186495 A WO 9524868 A	03-10-1995 21-09-1995
DE 19718081	A	05-11-1998	AU 7432398 A WO 9848695 A EP 0987983 A	24-11-1998 05-11-1998 29-03-2000